REMARKS

Claims 73-122 are now present in this application.

Claims 36-72 have been cancelled without prejudice or disclaimer, and claims 73-122 have been added. Reconsideration of the application, as amended, is respectfully requested.

Claims 36, 53 and 54 stand rejected under 35 USC 102(b) as being anticipated by WOLF, U.S. Patent 3,937,852. This rejection is respectfully traversed.

Claims 36, 37, 39-49, 53-58, and 60-64 stand rejected under 35 USC 102(e) as being anticipated by CHOQUETTE et al., U.S. Patent 5,861,113. This rejection is respectfully traversed.

Claims 38, 47-52, 59 and 65 stand rejected under 35 USC 103 as being unpatentable over CHOQUETTE et al. in view of MALLIK et al., U.S. Patent 5,085,514. This rejection is respectfully traversed.

Claims 36, 37, 39, 40, 46, 52-57, and 64-67 stand rejected under 35 USC 102(e) as being anticipated by SCHAEFER et al., U.S. Patent 6,006,415. This rejection is respectfully traversed.

Claims 38, 47-51, 59 and 68-72 stand rejected under 35 USC 103 as being unpatentable over SCHAEFER et al. in view of MALLIK et al. This rejection is respectfully traversed.

Claims 41, 42, 45, 58 and 60-63 stand rejected under 35 USC 103 as being unpatentable over SCHAEFER et al. in view of MALLIK et al. This rejection is respectfully traversed.

Claims 36-72 stand rejected under 35 USC 103 as being unpatentable over MIEKKA et al., U.S. Patent 4,913,858, in view of FORMOSA, U.S. Patent 5,825,475. This rejection is respectfully traversed.

Claim Amendments

It is noted that claims 36-72 have been cancelled without prejudice or disclaimer, and claims 73-122 have been presented.

Claim 73 corresponds to claim 36 and is based on claim 1 as originally filed, but amended to include that the first layer of a non-metallic material is held by a holding metal substrate, and that the metal substrate holds a color print layer. Thus, claim 73 corresponds to originally claim 1 amended to include the subject matter of original claims 3 and 4.

Claim 74 has been added and specifies that "the colour print layer is positioned between the metal substrate and the first layer of non-metallic material". Basis for new claim 74 is found in Figs. 6 and 7 (and in the description of these figures), wherein it is seen that the colour print layer is positioned between the metal substrate 1 and the first layer of non-metallic material 2.

Claim 75 corresponds to claim 2 as originally filed.

Claims 76-90 correspond to claims 39-53 of the claims filed on 19 June 2001.

Claim 91 has been amended to correspond to claim 73.

Claim 92 specifies 'wherein the colour print layer is positioned between the metal substrate and the first layer of non-metallic material'. Basis for the amendment is found in Figs. 6 and 7.

Claims 93-96 and 97-102 correspond to claims 55-58 and 60-65 of the claims filed on 19 June 2001.

Claims 103 and 104 correspond to claims 66 and 67 as presented on 27 December 2001.

Claims 105-122 have been added. Claims 105 and 116 are based on claims 12 and 29, respectively, of the application as filed, but amended to include that the metal layer is 'enhancing the reflectivity of the article'. Basis for this amendment may be found on page 7, lines 23-25.

**COLOUR PRINT LAYER - CLAIMS 73-104**

Novelty - 35 USC §102

Choquette et al. does not teach that a substrate containing the holographic image may include a colored layer (as also stated by the Examiner on page 5 in the Final Office Action dated 17 December 2002). Thus, it is respectfully submitted that new independent claims 73 and 91 are novel in view of Choquette et al.

Mallik et al. (US 5,085,514) does not disclose an article comprising both the flexible substrate and a metal substrate. Thus, it is respectfully submitted that new independent claims 73 and 91 are novel in view of Mallik et al.

Schaefer et al. (US 6,006,415) does not teach that the can is coated with a colored layer on the surface of the can prior to coating with embossing resin (as also stated by the Examiner on page 6 of the Office Action dated 1 April 2002). Thus, it is respectfully submitted that new independent claims 73 and 91 are novel in view of Schaefer et al.

Miekka et al (US 4,913,858) does not disclose a holding metal substrate, and it is therefore respectfully submitted that new claims 73 and 91 are novel in view of Miekka.

Non-obviousness - 35 USC §103

Schaefer et al. is considered to represent the closest prior art in relation to new claim 73.

Schaefer discloses a method wherein a strip of aluminium alloy sheet metal has a coating of transparent polyester on the surface thereof that receives a holographic image, cf. column 12, lines 16-20. Furthermore, the reference specifies that a decorative coating may be applied over, i.e. on top of, all or part of the hologram, cf. column 9, lines 11-13. As specified in column 4, lines 38-40 this means that the decorative coating is applied to the cans after

they have been embossed. It is therefore clear from the reference that in order to see the hologram through the decorative coating said coating must be transparent. Furthermore, Schaefer discloses in col. 10, lines 53-59, that the holographic image may be transferred to a thin, *clear* coating of polymer, however with less clarity of the object, [since the metal substrate provides the reflectivity]. Thus, the provision of a colour layer between the metal substrate and the polymeric coating would not provide a decorative coating according to the invention of Schaefer.

Thus, it is an object of the present invention to provide a method of replicating a surface relief having colours, which may be chosen independently of the transparency of the colours.

To fulfil this and other objects the present invention provides a colour print on the metal substrate so that the colour print is provided under the surface relief. Thus, the colours may have any nuance, as said colours are seen through the surface relief and not vice versa. Accordingly, the colours may e.g. be dark colours which has a good visual effect as pointed out on page 9, lines 34-35 in the description of the present invention.

Schaefer does not at all address the problem of providing freedom of choice of colours. On the contrary Schaefer only mentions that when a decorative coating is applied over the holographic image an extremely attractive can is created (Col. 9, lines 9-11).

A further advantage of the present invention in view of Schaefer is, that as the colour print layer is provided under the surface relief the thickness of the colour print layer is less critical for the visibility of the hologram and the perception of colour nuances. When the decorative layer is provided over the hologram as specified in Schaefer, it is important that the decorative layer is thin and uniform in thickness such that as little light as possible is absorbed by the layer, and such that a uniform absorption of light is provided over the surface. For this reason the decoration of Schaefer has been specified as a coating (cf. column 9, lines 9-15) i.e. very thin. When the decorative layer must be thin, small surface variations will imply great variations in the total thickness of the decorative layer and thus have great influence on the absorption of light in the decorative coating. E.g. a decorative coating having a non-uniform surface which is supposed to be perceived to have the same blue colour all over the surface will have variations in the nuances over the surface as higher areas will be perceived to be darker blue than lower areas.

When using the present invention, the colour print layer is not necessarily thin as it is not supposed to be transparent or clear. Thus surface variations will imply small variations in the total thickness of the layer and thus result in only inferior variations in the nuances of the colour. Accordingly, the method

according to the present invention may be carried out using less precise machines, which evidently will be cheaper than using the precise machines, which are needed when carrying out the invention according to Schaefer.

Additionally, it is an advantage of the present invention in view of Schaefer, that the first layer of non-metallic material and the colour print layer may be provided as one layer since the non-metallic layer may comprise printing inks. The product according to Schaefer comprises a metallic layer, a coating of transparent polyester and a decorative coating, cf. claim 1 and 12 and column 9, lines 9-15, and thus always comprise three layers whereas the product according to the present invention may in some embodiments comprise only two layers - a metal substrate and a combined non-metallic layer and colour print layer. This will imply fewer production steps and be easier and cheaper compared to the method according to Schaefer.

Applicants respectfully disagree with the Examiner in that it would be obvious for a person skilled in the art to combine Schaefer with Mallik et al. as stated in the Office Action of 17 December 2002. Mallik is concerned with forming a surface relief light diffraction pattern in a surface of a substantially transparent substrate and filling in the surface relief diffraction pattern with a printing material, cf. claim 1 of Mallik. Mallik discloses a casting technique wherein a web 111 of flexible

material is drawn off a large roll and passed through a plurality of rollers, cf. column 3, lines 47-60 and fig. 1. The web substrate material 11 may be very thin plastic or plastic and may be used for bank notes, cf. column 5, lines 25-29. Accordingly Mallik neither hints nor suggests to provide a web made of metal, so the skilled person skilled are not taught to use a web made of metal.

Furthermore, as Mallik specifies that the web must be of a material which is able to allow ultraviolet radiation to be directed through the web, it is clear for the skilled person that a metal substrate may not be provided under the web, as such a material does not allow ultraviolet light to be directed through the web.

Accordingly the skilled person would not arrive to the claimed invention on the basis of Mallik. As Schaefer and Mallik evidently are not related to the same field of technology, and as none of said two references provides literal references or hints to look in the other reference the skilled person would not consider to combine the two references. Even if the skilled person did combine these two references, according to the above arguments, he would not arrive at the claimed invention.

Applicants also respectfully disagree with the Examiner that it would be obvious for a person skilled in the art to combine Choquette et al. with Mallik as stated on page 5-6 of the Office Action of 17 December 2002. It is an essential feature of the

present invention that as much light emitted towards the surface relief is reflected such that the surface relief may be seen. Choquette is not concerned with reflecting incoming light. On the contrary Choquette is concerned with the opposite problem i.e. keeping as much light as possible in the waveguide. As Mallik and Choquette evidently are not related to the same field of technology and as none of said two references provides literal references or hints to look in the other reference the skilled person would not consider to combine the two references.

Applicants also respectfully disagree with the Examiner that it would be obvious for a person skilled in the art to arrive at the claimed invention in view of Miekka et al. as stated on page 4 of the Office Action dated 19 December 2000. Miekka is concerned with the provision of an embossing in a coating of a substrate comprising paper, said coating being of a thermoplastic material, cf. column 9, lines 51-59 and column 4, line 56. Miekka is not at all concerned with providing a holding metal substrate, which holds a colour layer as described in claim 36 of the present invention. Miekka discloses that solid opaque or tinted colours can be embossed directly to give the luster and effect of metallization without actual metallization, cf. column 8, line 45-48. Thus the reference specifically specifies that when embossing in a colour layer no metallization shall be provided.

Furthermore Miekka specifies that the embossing pattern can, in parts, be filled in with a coating material, such as ink or clear lacquer, in those areas where no embossed decoration is desired, cf. column 6, lines 54-57. Thus the skilled person from Miekka knows that ink can be used to hide the embossed decoration which obviously must be done by providing the ink over the embossed decoration and not under the embossed decoration. Miekka further specifies that the metallized surface is a metallic film i.e. very thin and therefore not a holding metal substrate, cf. Fig. 10. Accordingly, the references neither hints nor suggest to provide a holding metal substrate, which holds a colour print.

Based on the above arguments, it is respectfully submitted that the invention according to claim 73, as well as its dependent claims, are non-obvious in view of the prior art utilized by the Examiner.

In addition, as claim 91 comprises the product claim corresponding to claim 73, it is respectfully submitted that claim 91, as well as its dependent claims, are also is non-obvious in view of the prior art utilized by the Examiner.

**METAL LAYER - CLAIMS 105-122**

Novelty - 35 USC §102

Yamaguchi et al. (US 5,200,253) discloses hologram forming sheets comprising a polypropylene resin on a substrate, such as a polypropylene, polycarbonate or cellophane substrate and a hologram forming surface provided on one side of said resin, cf. column 28, lines 29-39.

However, Yamaguchi et al. does not disclose that a first layer of a non-metallic material is being held by a metal substrate and neither discloses that the metal layer is enhancing the reflectivity of the article of at least part of a surface relief on the non-metallic material. Accordingly, new independent claims 105 and 116 are novel in view of Yamaguchi.

Mallik et al. (US 5,085,514) discloses a process of forming microstructure pattern replicas on a flexible substrate. A web of flexible substrate material is drawn of a large roll of such material and passed through various process step. However, the reference fails to disclose an article comprising both the flexible substrate and a metal substrate. Accordingly, new independent claims 105 and 116 are novel in view of Mallik et al.

Miekka et al. (US 4,913,858) discloses providing a substrate comprising paper and providing a coating of thermoplastic material thereon. The reference discloses a metal film provided under the

surface relief or on top of the surface relief. However, there is no disclosure of providing a metal substrate, only a metal film layer is used, which film is provided *either* under or on top of the surface relief. Thus, there is in Miekka no disclosure of providing a metal substrate and a metal layer on the surface relief, and accordingly claim 105 and 116 of the present invention is novel in view of Miekka.

Choquette et al. (US 5,861,113) discloses the provision of holograms, such as gratings, etc in a waveguide and a method of providing the holograms by the use of masters and submasters. However, Choquette et al. are concerned with coupling of light *into* a waveguide structure and do not disclose that a metal layer covering at least part of the first layer of non-metallic material is enhancing the reflectivity of the article.

Non obviousness - 35 USC §103

Choquette et al. (US 5,861,113) discloses the provision of diffractive optic patterns, such as holograms and gratings, etc. in a waveguide and a method of providing the diffractive optic patterns by the use of masters and submasters.

Choquette describes that the substrate may be glass, ceramic, polymer or metal. Choquette is further concerned with the fabrication of master and submasters having a diffractive optic pattern to be transferred to an article, and production of articles

wherein the diffractive optic pattern of the master or submaster is embossed into a plastic material.

It is noted that the master, the submaster and the article wherein the diffractive optic pattern is embossed are three different embodiments of the disclosure.

The master is the first form made for generating replicated diffractive optic patterns, and the submaster is another form made from the master and adapted to be used to replicate the diffractive optic pattern in the plastic material of the article.

The master and submaster may be provided with a metal coating, however, since the master and submaster are only to be used for replicating the diffractive optic pattern, Applicants respectfully submit that the metal is not provided for enhancing the reflectivity of an article as there would be no reasoning for this. Rather the metal coating is provided for enhancing the strength of the master and submaster so that more diffractive patterns may be replicated without degradation of the pattern by wear and tear of the master or submaster. The surface properties of this metal layer is thus most likely not significantly reflecting.

Neither the article nor the method of replicating a surface relief as claimed in clams 105 and 116 are disclosed since Choquette describes that a coating having a metal layer is only relevant if a waveguide is subsequently provided on top of the metal layer so as to be able to couple light into the waveguide

(cf. col. 7, lines 50-57). Thus, the metal layer is not provided to enhance the reflectivity of the article, being the waveguiding device. Enhancing the reflectivity of the article would not be feasible in the context of Choquette, in that light would then be reflected and not coupled into a waveguide.

Furthermore, Choquette describes the reproduction of useful optics, such as optics providing gratings on waveguides, couplers, narrow-band filters, beam-splitters, etc. There is no mentioning of using the process or replicated surface structures for providing articles having an enhanced reflectivity in that only coupling, splitting, etc. of light is disclosed.

It is therefore respectfully submitted that claims 105 and 116 are novel and non-obvious in view of Choquette.

Yamaguchi et al. (US 5,200,253) discloses hologram forming sheets comprising a polypropylene resin on a substrate, such as a polypropylene, polycarbonate or cellophane substrate and a hologram forming surface provided on one side of said resin, cf. column 28, lines 29-39. The hologram forming sheets may be used to wrap goods.

As mentioned above, Yamaguchi et al. does only disclose that a first layer of a non-metallic material, e.g. the polypropylene resin, is provided on a substrate of polypropylene, polycarbonate, cellophane, etc. and does not disclose that the first layer of non-metallic material is being held by a metal substrate. The hologram forming sheets are used to wrap goods so that it would not be

feasible to provide a metal substrate for wrapping goods, since a metal substrate for holding something is not immediately suitable for wrapping. Since a metal substrate is not provided it will not enhance the reflectivity of the article of at least part of a surface relief on the non-metallic material.

It is not found that neither Yamaguchi as taken alone, nor the combination of Choquette and Yamaguchi would provide any indication of a method of replicating a surface relief according to claim 105, neither an article according to claim 116.

Mallik et al. (US 5,085,514) discloses a process of forming microstructure pattern replicas on a flexible substrate, such as a bank note. A web of flexible substrate material is drawn of a large roll of such material and passed through various process step. It would not be feasible to form the microstructure pattern for bank notes on a metal substrate holding a non-metallic material. There is no disclosure of using a metal substrate and the skilled person would not even consider using a holding metal substrate for the manufacture of bank notes.

It is not found that neither Mallik as taken alone, nor any combination of Mallik, Choquette and/or Yamaguchi would provide any indication of a method of replicating a surface relief according to claim 105, neither an article according to claim 116.

Miekka et al. (US 4,913,858) discloses providing a substrate comprising paper and providing a coating of thermoplastic material

thereon. The reference discloses a metal film provided under the surface relief or on top of the surface relief. However, it is specifically stated that the metal film is provided either before the hologram embossing or after, i.e. either below or on top of the thermoplastic coating but not both, cf. col. 9, lines 1-3. Furthermore, the use of a metal substrate is not disclosed and even if the skilled person should consider using a metal substrate, he would not at all be lead to the use of a metal layer on top of the surface relief. On the contrary, Miekka et al. teaches away from the use of metal both on top and below the surface relief, cf. col. 9, lines 1-3.

In view of the above, it is respectfully submitted that neither Miekka as taken alone, nor any combination of Choquette and Mallik, Miekka and/or Yamaguchi would provide any indication of a method of replicating a surface relief according to claim 105, neither an article according to claim 116.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present invention is neither taught nor suggested by the prior art utilized by the Examiner. Reconsideration and withdrawal of all rejections are therefore respectfully requested.

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

CONCLUSION

In the event the Examiner does not consider this application to be in condition for allowance, it is respectfully requested that this Amendment be entered for the purposes of Appeal. This Amendment should overcome the current grounds of rejection and therefore simplify the issues for Appeal. Nonetheless, it should be unnecessary to proceed to Appeal because the instant application should now be in condition for allowance.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants respectfully petition for a three (3) month extension of time for filing a response in connection with the present application and the required fee of $930.00 is attached herewith.

**Attached hereto is a marked-up version of the changes made to the application by this Amendment.**

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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KM/asc
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Attachment: Version with Markings to Show Changes Made

(Rev. 04/30/03)

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

IN THE CLAIMS:

Claims 36-72 have been canceled without prejudice or disclaimer.

Claims 73-122 have been added.